

EXHIBIT B

Part 2 of 6

Definitions

Terminology

The following definitions are from Title 49, Code of Federal Regulations (49CFR), Parts 567.3, 568.3 and 571.3 where noted. Canadian definitions are from Canada Motor Vehicle Safety Regulations (CMVSR), Section 2(1), and are in italics. Ford Motor Company definitions are for the purpose of this publication only. Some terms are followed by an abbreviation that may be used throughout this publication.

Alterer — a person who alters by addition, substitution, or removal of components (other than readily attachable components) a certified vehicle before the first purchase of the vehicle other than for resale. (49CFR567.3)

Ambulance — a vehicle for emergency medical care which provides: a driver's compartment; a patient compartment to accommodate an Emergency Medical Technician (EMT), Paramedic, and two litter patients (one patient on the primary cot and secondary patient on a folding litter located on the squad bench) so positioned that the primary patient can be given intensive life-support during transit; equipment and supplies for emergency care at the scene as well as during transport; two-way radio communication; and, when necessary, equipment for light rescue/extrication procedures. The Ambulance shall be designed and constructed to afford safety, comfort, and avoid aggravation of the patient's injury or illness. (From Federal Specification KKK-A-1822-F). Ford Motor Company also includes within its definition of ambulance any vehicle that is used for transporting life support equipment, for rescue operations, or for nonemergency patient transfer if the engine of the vehicle is equipped with a "throttle kicker" device, which enables an operator to increase engine speed over normal idle speed when the vehicle is not moving. (Ford Motor Company)

B-Pillar — the vehicle body structure located directly rearward of each front door. This structure will include the outer panel, all inner panels or reinforcements which support the door opening, the door latching system and/or the roof structure. (Ford Motor Company)

Basic (Stripped) Chassis — an incomplete vehicle, without occupant compartment, that requires the addition of an occupant compartment and cargo carrying, work performing, or load-bearing components to perform its intended function. (Ford Motor Company)

Bus — a motor vehicle with motive power, except a trailer, designed for carrying more than 10 persons. (49CFR571.3)

Bus (Canada) — *a vehicle having a designated seating capacity of more than 10, but does not include a trailer or a vehicle imported temporarily for special purposes. (autobus)*

Chassis Cab — an incomplete vehicle, with completed occupant compartment, that requires only the addition of cargo-carrying, work-performing or load-bearing components to perform its intended functions. (49CFR567.3)

Completed Vehicle — a vehicle that requires no further manufacturing operations to perform its intended function. (49CFR567.3)

Critical Control Item — a component or procedure which may affect compliance with a Federal regulation or which could directly affect the safe operation of the vehicle. The identifying symbol is an inverted delta (∇). (Ford Motor Company)

Cutaway Chassis — an incomplete vehicle that has the back of the cab cut out for the intended installation of a structure that permits access from the driver's area to the back of the completed vehicle. (Ford Motor Company)

Cutaway Chassis (Canada) — *an incomplete vehicle that has the back of the cab cut out for the intended installation of a structure that permits access from the driver's area to the back of the completed vehicle. (châssis tronqué)*

Designated Seating Position — a seat location that has a seating surface width, as described in §571.10(c) of this part, of at least 330 mm (13 inches). The number of designated seating positions at a seat location is determined according to the procedure set forth in §571.10(b) of this part. However, for trucks and

multipurpose passenger vehicles with a gross vehicle weight rating greater than 10,000 lb., police vehicles as defined in S7 of FMVSS 208, firefighting vehicles, ambulances, and motor homes, a seating location that is labeled in accordance with S4.4 of FMVSS 207 will not be considered a designated seating position. For the sole purpose of determining the classification of any vehicle sold or introduced into interstate commerce for purposes that include carrying students to and from school or related events, any location in such a vehicle intended for securement of an occupied wheelchair during vehicle operation is regarded as four designated seating positions. (49CFR571.3)

Designated Seating Position (Canada) — *a location in a vehicle that is likely to be used as a seating position and that has a seating surface width of at least 330 mm; (place assise désignée)*

Final-Stage Manufacturer — a person who [company that (CMVSR)] performs such manufacturing operations on an incomplete vehicle that it becomes a completed vehicle. (49CFR567.3)

Firefighting Vehicle — a vehicle designed exclusively for the purpose of fighting fires. (49CFR571.3)

Gross Axle Weight Rating (GAWR) — the value specified by the vehicle manufacturer as the load carrying capacity of a single axle system, as measured at the tire-ground interfaces. (49CFR571.3)

Gross Combination Weight Rating (GCWR) — the value specified by the manufacturer as the loaded weight of a combination vehicle. (49CFR571.3)

Gross Vehicle Weight Rating (GVWR) — the value specified by the manufacturer as the loaded weight of a single vehicle. (49CFR571.3)

H-Point — the mechanically hinged hip point of a manikin which simulated the actual pivot center of the human torso and thigh, described in SAE Recommended Practice J826, "Manikins For Use in Defining Vehicle Seating Accommodation," November 1962. (49CFR571.3)

H-Point (Canada) — the mechanically hinged hip point of a manikin that simulates the actual pivot centre of the human torso and thigh, described in SAE Standard J826APR80, *Devices for Use in Defining and Measuring Vehicle Seating Accommodation*. (Point H)

Incomplete Vehicle — an assemblage consisting, as a minimum, of chassis (including the frame) structure, power train, steering system, suspension system, and braking system, to the state that those systems are to be part of the completed vehicle, but requires further manufacturing operations to become a completed vehicle. (49CFR567.3)

Incomplete Vehicle (Canada) — a vehicle (a) other than a vehicle imported temporarily for special purposes, that is capable of being driven and that consists, at a minimum, of a chassis structure, powertrain, steering system, suspension system, and braking system in the state in which those systems are to be part of the completed vehicle, but requires further manufacturing operations to become a completed vehicle or (b) that is an incomplete trailer. (véhicule incomplet)

Incomplete Vehicle Manufacturer — a person [company that (CMVSR)] who manufactures an incomplete vehicle by assembling components none of which, taken separately, constitute an incomplete vehicle. (49CFR567.3)

Intermediate Manufacturer — a person [company that (CMVSR)], other than the incomplete vehicle manufacturer or the final stage manufacturer, who performs manufacturing operations on an incomplete vehicle. (49CFR567.3)

Motor Home — a multi-purpose vehicle with motive power that is designed to provide temporary residential accommodations, as evidenced by the presence of at least four of the following facilities: cooking; refrigeration or ice box; self-contained toilet; heating and/or air conditioning [system that can function independently of the vehicle engine (CMVSR)]; a potable water supply system including a faucet and a sink; and a separate 110-125 volt electrical power supply and/or an LP gas supply. (49CFR571.3)

Multifunction School Activity Bus (MFSAB) — a school bus whose purposes do not include transporting students to and from home or school bus stops. (49CFR571.3)

Multipurpose Passenger Vehicle (MPV) — a motor vehicle with motive power, except a low-speed vehicle or trailer, designed to carry 10 persons or less which is constructed either on a truck chassis or with special features for occasional off-road operation. (49CFR571.3)

Multipurpose Passenger Vehicle (MPV) (Canada) — a vehicle having a designated seating capacity of 10 or less that is constructed either on a truck chassis or with special features for occasional off-road operation, but does not include an air cushion vehicle, an all-terrain vehicle, a golf cart, a low-speed vehicle, a passenger car, a truck or a vehicle imported temporarily for special purposes. (véhicule de tourisme à usages multiples)

Pickup Box Delete — a chassis cab incomplete vehicle created by ordering a Pickup Box Delete option on an otherwise completed vehicle. (Ford Motor Company)

School Bus — a bus that is sold, or introduced in interstate commerce, for purposes that include carrying students to and from school or related events, but does not include a bus designed and sold for operation as a common carrier in urban transportation. (49CFR571.3)

School Bus (Canada) — a bus designed or equipped primarily to carry students to and from school. (autobusscolaire)

Seating Reference Point — the unique design H-point, as defined in SAE J1100 (June 1984), which: a) establishes the rearmost normal design driving or riding position of each designated seating position in a vehicle; b) has X, Y, and Z coordinates established relative to the designed vehicle structure; c) simulated the position of the pivot center of the human torso and thigh; and d) is the reference point employed to position the two-dimensional drafting template described in SAE J826 (May 1987) (abbreviated by Ford Motor Company)

Seating Reference Point (Canada) — the unique Design H-point, as defined in section 2.2.11.1 of SAE Recommended Practice J1100 (June 1993), that: a)

establishes the rearmost normal design driving or riding position of each designated seating position, taking into account all modes of adjustment - horizontal, vertical and tilt - in a vehicle, b) has X, Y, and Z coordinates, as defined in section 2.2.3 of SAE Recommended Practice J1100 (June 1993), established relative to the designed vehicle structure, c) simulates the position of the pivot centre of the human torso and thigh, and d) is the reference point employed to position the H point template with the 95th percentile leg, as described in section 3.1 of SAE Standard J826 (June 1992), or, if that drafting template cannot be positioned, the reference point when the seat is in its rearmost adjustment position (point de référence de position assise)

Second Unit Body (SUB) — consists of the body structure and/or all the cargo carrying, work performing, and/or load bearing components and/or equipment installed by a subsequent stage manufacturer on an incomplete vehicle, such that the incomplete vehicle becomes a completed vehicle. (Ford Motor Company)

Service Body — a second unit body typically consisting of a box enclosure that extends below the frame level to a height above ground approximately level with the center of the rear axle and the rear bumper. (Ford Motor Company)

Subsequent Stage Manufacturer — a term which means either intermediate or final stage manufacturers or both. (Ford Motor Company)

Trimmed Seat — a complete functional seat assembly including the seat pedestal, seat track, seat base frame, seat back, recliner mechanism, seat padding, all attaching hardware, and the final trim material (i.e., cloth, leather, or vinyl). (Ford Motor Company)

Truck — a motor vehicle with motive power, except a trailer, designed primarily for the transportation of property or special purpose equipment. (49CFR571.3)

Truck (Canada) — a vehicle designed primarily for the transportation of property or special-purpose equipment, but does not include a competition vehicle, a crawler-mounted vehicle, a trailer, a work vehicle, a vehicle imported temporarily for special purposes or a vehicle designed for operation exclusively off-road. (camion)

Truck Tractor — a truck designed primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn. (49CFR571.2)

Truck Tractor (Canada) — a truck designed primarily for drawing other vehicles and not constructed for carrying any load other than part of the weight of the vehicles and load drawn, and includes a vehicle designed to accept a fifth-wheel coupling, but does not include a crane-equipped breakdown vehicle. (camion letracteur)

Under Body — the area between the frame rails of a vehicle. If the vehicle does not have frame rails, the entire under area of the vehicle is included in the definition

Under Hood — the engine compartment area rearward of the front of the engine cooling radiator

Unloaded Vehicle Weight (UVW) — the weight of a vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants, or accessories that are ordinarily removed from the vehicle when it is not in use. (49CFR571.3)

Unloaded Vehicle Weight (UVW) (Canada) — the weight of a vehicle equipped with the containers for the fluids necessary for the operation of the vehicle filled to their maximum capacity, but without cargo or occupants. (poids du véhicule sans charge)

Untrimmed Seat — the structure including the seat pedestal, seat track, seat base frame, seat back, recliner mechanism, seat padding and all attaching hardware required for a functional seat assembly without the final trim material (e.g., cloth, leather or vinyl) and trim material attaching components. (Ford Motor Company)

Walk-In Van — a special cargo/mail delivery vehicle that has only one designated seating position. That designated seating position must be forward facing and for use only by the driver. The vehicle usually has a thin and light sliding (or folding) side door for easy operation and a high roof clearance that a person of medium stature can enter the passenger compartment area in an up-right position. (49CFR571.214)

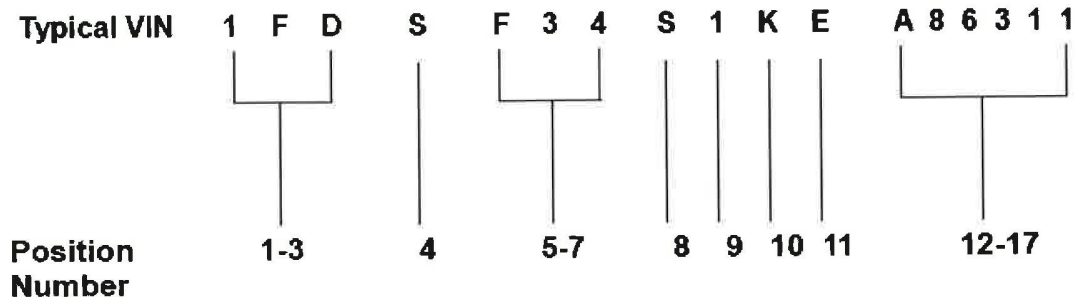
Walk-In Van (Canada) — a van type of truck in which a person having a height of 1700 mm can enter the occupant compartment in an upright position by a front door. (fourgon à accès en position debout)

VIN Coding Information

Universal Vehicle Identification Numbers (VINs) have 17 "positions". There is a number or letter in each position (see example below).

A "VIN Guide" document is accessible on the Ford Fleet web site under the "Parts and Service" tab at: www.fleet.ford.com/partsandservice/vin-guides/

A "VIN Decoder" tool is also available (login required) on the Ford Fleet web site under the "Parts and Service" tab at: www.fleet.ford.com/partsandservice/vin-decoder/



Positions 1-3
Position 4

Positions 5-7
Position 8
Position 9
Position 10
Position 11
Positions 12-17

World Manufacturer Identifier
Restraint System Type (Passenger Car Only);
Brake Type, GVWR Class, and Restraint System Type
(Trucks, MPVs and Buses)
Line, Series, Body Type
Engine Type
Check Digit
Model Year
Assembly Plant
Production Sequence Number

New Vehicle and Long Term Storage Guidelines

General

- Wherever possible, vehicles should be stored in an enclosed, dry, well-ventilated area on firm, well drained ground which is free of long grass or weeds and protected from direct sunlight.
- For stripped chassis, ensure chassis interior and dunnage box are protected from the elements.
- For cutaways and door delete models, ensure back panel plastic sheet is intact and/or temporary door is in place when vehicles are stored outside or moved.
- Any chassis with an incomplete roof modification should not be stored outside unless appropriately protected.

Body

- Wash the vehicle thoroughly to remove dirt, grease, oil, tar, or mud from exterior surfaces, rear wheel housing, and underside of front fender. Periodically re-wash vehicles stored in exposed locations.
- Touch up exposed raw or primed metal to provide rust protection.
- Cover chrome and stainless steel parts with a thick coat of auto wax to prevent discoloration. Re-wax as necessary when the vehicle is washed.
- Keep all rubber parts free from oil and solvents.
- Cover the interior soft trim to prevent fading, if stored in exposed location.
- Make sure that all windows, doors, hood, and roof opening panel are completely closed.
- Set climate controls to the "open" position to provide ventilation, where possible.
- All SUB air intakes should be closed.

Engine / Transmission

- Start the engine every 15 days and move the vehicle at least 25 feet. Run the engine until it reaches normal operating temperature. With your foot on the brake, shift the transmission through all the gears (R, N, D etc.) while engine is running.
- Check for fluid leaks under the vehicle.

- Confirm the transmission fluid dipstick (if equipped) is fully seated in the tube.
- Stripped Chassis vehicles – cover transmission vent to prevent water from entering through the vent, including steady water runoff from surrounding components.

Fuel System

- Fill the fuel tank with high-quality fuel until the first automatic shutoff of the fuel pump nozzle.
- Every 15 days, move the vehicle at least 25 feet to mix fuel anti-oxidation agents.
- A commercially available gasoline fuel stabilizer ("Sta-Bil" or equivalent) should be added to gasoline powered vehicles or a diesel fuel stabilizer ("Fire Prep 100" or equivalent) to diesel powered vehicles whenever expected or actual storage periods exceed 60 days. The manufacturer's instructions packaged with the product should be followed. The vehicles should then be operated at an idle speed to circulate the additive throughout the fuel system. Fuel stabilizer helps prevent oxidation, which could cause damage to rubber or plastic materials in the fuel system or clog the fuel supply system.

Cooling System

- Maintain appropriate antifreeze protection against freezing temperatures.
- Only use coolant as recommended in your vehicle owner's manual.

Battery

- During extended vehicle storage, make sure the battery voltage never drops below 12.4 volts in order to maintain battery life. The use of a Battery maintenance charger is ideal as it monitors the battery voltage and charges it as necessary.
- If it is not possible to use a maintenance charger, disconnect the battery negative terminal during storage of more than 30 days to prevent the vehicle from discharging the battery. (Note that if the vehicle battery is disconnected, it will be necessary to reset vehicle memory features.) Make sure the battery is at full charge prior to storage, then measure the voltage

every three to six months and charge the battery if it falls below 12.4 volts.

- Keep battery connections clean and covered with a light coat of grease.

Brakes

- Make sure service brakes and the parking brake are fully released. Apply suitable wheel chocks to prevent vehicle from moving.

Wheels and Tires

- Maintain recommended air pressures.
- Wheel trims (where fitted) should be removed and stored inside the vehicle.

Miscellaneous

- Verify that all linkages, cables, clevis pins, and levers under the vehicle are covered with grease to prevent rust.

Removing the Vehicle from Storage

- Wash the vehicle to remove any dirt or grease film build-up on window surfaces.
- Check battery voltage and charge as necessary. Reconnect cables if they had been disconnected.
- Check windshield wipers for any deterioration.
- Check under the hood for any foreign material that may have collected during storage such as mice or squirrel nests.
- Check the exhaust for any foreign material that may have collected during storage.
- Check tire pressures and set tire inflation per the Tire Label.
- Check that fluids are at appropriate levels (engine coolant, engine oil, fuel, wiper washer fluid etc.).
- Check brake pedal operation. Drive your vehicle 15 feet (4.5 m) back and forth to remove rust build-up.

Design Recommendations

The following recommendations are intended to assist in the design of various systems and components with the aim of creating a completed vehicle that meets regulatory and customer needs. Since completed vehicles may take many forms, the following recommendations cannot cover all the possibilities.

Second Unit Body Structures and Mounting

The structural design and materials used in the construction of second unit bodies must be sufficient to help control collapse of the body and prevent disengagement from the chassis when tested in accordance with applicable regulations. Steel or aluminum structures are recommended, wood or composite materials may require additional reinforcements to provide the necessary structural integrity. SUB structures should not extend rearward beyond (overhang) the end of the frame side members.

Please see the applicable program specific Incomplete Vehicle Manual and/or Body Builder Layout Book for requirements and recommended best practices for SUB to chassis mounting for that particular vehicle

SUB floor and bulkhead structures must accommodate the Ford fuel fill system and appropriate design clearances. Fuel fill neck locations and compliance representations regarding fuel systems are in the Statements of Conformity section of the Incomplete Vehicle Manual. See the section on Fuel Systems in this document for additional information that may apply to the Second Unit Body.

Body Components

The following recommendations should be heeded regarding body components:

- Running boards or entry steps should use a mounting system that will attach only to the body. A system that combines both frame and body mounting points may cause frame induced noise, vibration, and harshness (NVH) to transfer through the mounting system into the body. This also may result in increased risk for component, body and/or frame damage and loosening of attaching fasteners.
- Use a butyl type sealer on the raw edges of modified steel body sheet metal panels to prevent corrosion.
- Temporary mounting pads may eliminate chipping and scratches when accessories are installed.
- Select material pairs that are compatible to prevent galvanic corrosion. See section of this document regarding mounting to aluminum and magnesium components.
- When adding holes to the floor of the vehicle, consideration must be given to all components below the floor. The use of drill stops is recommended to prevent accidental damage.
- Fasteners added to the floor should not point at the fuel tank (in design position or when deformed in a crash situation) or should be appropriately shielded.
- Components with sharp edges in proximity to the fuel tank should be avoided or appropriately shielded to eliminate the possibility of fuel tank penetration in crash situations.
- When a closed Second Unit Body (SUB) or rear panel is attached directly to the back of a Cutaway body, difficulty may be experienced when closing doors due to air pressure build up. It is recommended that vent(s) be installed to allow "ONE WAY" pressure release from the inside of the cab to the outside. The recommended minimum size of the venting is 36 square inches.
- Added body vents, especially powered vents, should be located away from the fuel fill, fuel system vents and exhaust outlets to avoid fuel vapors and exhaust gas entering the interior of the vehicle.

Attaching Accessories to Aluminum Panels and Structure

Vehicle modifiers should take note that when installing aftermarket equipment, corrosion can occur if dissimilar metals are in contact with aluminum body panels or structure. This type of corrosion is called "galvanic" corrosion.

Any time the factory paint is disturbed, it is recommended that the paint be repaired with a suitable coating prior to installing aftermarket equipment (i.e. splash guards, bug shields, tool boxes, etc.). When installing steel fasteners into the mounting hole, the fastener should not have contact with the aluminum sheet metal. For zinc coated steel bolts and screws, an aluminum washer should be used. For further protection, an isolation layer such as polypropylene or urethane tape can be used between the dissimilar metals

Approved Anti-Corrosion Coatings

- Motorcraft PM13-A
- NOX-Rust 7703-W
- Zinc Rich Primer

Recommended Acrylic Lacquer Touch-up Paints

- Motorcraft
- Duplicolor
- Rustoleum

Approved Fasteners

- Aluminum Clamps
- Aluminum Blind Pull-Pin Rivets
- Plastic Trim Pins
- Plastic Push Pins
- Aluminum Rivet nuts
- Zinc coated steel fasteners used with an aluminum washer

Isolator Recommendations

- Aluminum washer
- Urethane tape
- Polypropylene tape

The following figures illustrate some best practices to prevent dissimilar metals from coming in contact with aluminum.

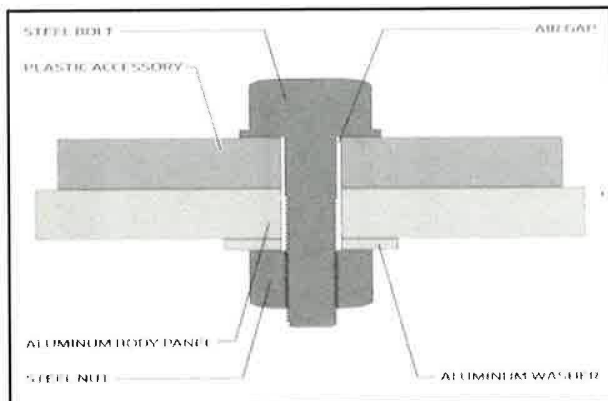


Figure 1 – Plastic Accessory

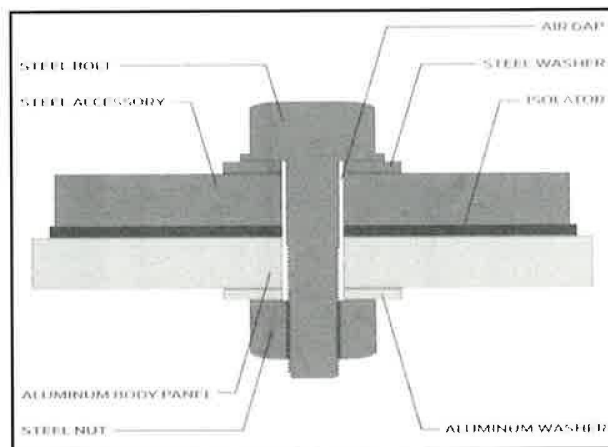


Figure 2 - Steel Accessory

Figure 1 shows a plastic accessory attached to aluminum sheet metal and the fastener properly isolated from contact with the aluminum sheet metal.

Figure 2 shows a steel accessory and steel fastener properly isolated from contact with the aluminum sheet metal.

Note: both figures show the fastener using an aluminum washer and having an oversize hole providing an air gap to the aluminum sheet metal.

Important: The items listed below can accelerate galvanic corrosion in aluminum and should be avoided. If a steel

fastener must be used, it is necessary to properly isolate it from contact with the aluminum.

- self-tapping screws
- steel rivet nut
- steel blind pull-pin rivets
- steel spring clips
- RTV silicone
- stainless steel fastener

For Pickups with aluminum bodies: It is not recommended to make modifications or repairs that encroach on the "box to frame" or "cab to frame" interface.

When adding accessories that require an electrical ground to the chassis, follow the guidelines below.

- Only add ground cables to the sides of frame rails
- Do not add grounds to the Aluminum sheet metal

Attaching Accessories to Magnesium Structure

Similar to attaching to aluminum structure (see section above), attaching accessories to magnesium structural components requires careful isolation of dissimilar materials to prevent galvanic corrosion.

If using a steel fastener in contact with, or passing through magnesium, the following isolation methods are recommended:

- Steel bolt and/or nut is zinc coated
- 5052 Aluminum washer used to isolate the bolt or nut head.
 - The washer must be a minimum 0.5 mm thick, thicker washers are recommended when used on horizontal surfaces.
 - Diameter of the washer must be a minimum of 10mm larger than the diameter of the bolt or nut flange, or steel washer if one is used.
 - Stamping direction of the aluminum washer must be AWAY from the mating magnesium surface. This will prevent the stamping burr on the washer from scoring the magnesium base material or coating.
- A Nylon sleeve must be used on the neck of the bolt where it passes through the magnesium structure.

Nylon material must have a carbon content less than 2% to prevent corrosion.

These precautions are meant to protect against water droplets from being in contact with the coated steel fastener and magnesium at the same time. Joints should also be positioned to minimize the chance of water pooling near the head of the fastener.

The materials and design criteria above are specified for steel fasteners, but can be extended in a similar way to isolate steel accessories that are attached to magnesium components.

Headlight Alignment

Headlight initial aim is set at the assembly plant, but may not be correct for your final vehicle configuration. Verification of headlight aim after installation of the SUB is the responsibility of the final stage manufacturer, and should be part of the completed vehicle sign-off.

Heat Management

The following guidelines should be followed to ensure proper management of heat energy:

- Under body longitudinal or lateral air movement should not be restricted. Frame spacers designed by the intermediate and final stage manufacturer should provide for adequate airflow over the frame.
- No portion of the floor pan should drop below the body sills, nor should the under body structure drop below the top surfaces of the chassis frame rails. These conditions can result in reduced airflow or pinched fuel lines or vapor hoses, which can raise the temperature of under body components and increase fuel system pressure.
- Any interior floor underlayment, insulation or chassis mounted component within 101.6 mm [4 in] of the exhaust system, without benefit of the Ford provided heat shields, must be capable of withstanding 371°C [700°F] (482°C [900°F] in close proximity to the catalyst) during normal operating conditions.
- Second unit body exterior panels, tool boxes, running boards, structures, or skirting that extend below the bottom of the frame, may affect under body temperatures. The final stage manufacturer should verify that under body temperatures of the completed vehicle are compatible with all vehicle components during the projected vehicle duty cycle and vehicle loading.
- Full-width mud flaps should not be installed as they restrict airflow under the vehicle and can increase under body temperatures.
- Added structure or equipment should not restrict air circulation in the engine compartment.
- Use of wood in construction should be eliminated where at all possible. If used, wood should be adequately protected from moisture and heat. Shields should be added if wood is installed near exhaust components.
- It is not recommended to add any vent to the vehicle hood as a means to lower under hood temperatures. Depending on the location and orientation of added vents, they may cause hot air to be recirculated toward the radiator or cause hot air and/or

undesirable fumes to be directed toward the climate control intake in the vehicle cowl.

The subsequent stage manufacturer should also consider the following situations, which may have an adverse effect on heat management:

- Poor vehicle service or lack of maintenance
- Deviation from a Ford recommended antifreeze coolant
- Exceeding Ford GVWR and GCWR ratings
- Altering, changing, removing Ford engine cooling fan and shroud
- Altering, changing, removing Ford heat shields, heat sleeves, and/or other thermal protection elements
- Blocked radiator grille area (spare tire, bicycles, etc.)
- Use of throttle kickers
- Addition of aftermarket PTO system



Fuel System

WARNING:

Before opening the fuel system, removing or re-installing any Ford fuel system component, relieve fuel pressure by following the instructions in the Ford Shop Manual for the appropriate model and model year. The evaporative emission system contains fuel vapor and condensed fuel vapor. Although not present in large quantities, it still presents a danger of explosion or fire. When welding near fuel system components, all metallic components should be adequately shielded and protected from heat or weld splatter. All non-metallic components should be removed.

When extending a vehicle wheelbase on vehicles equipped with a mid-ship fuel tank, the tank and fuel line system must remain in the same position relative to the OEM rear frame and axle assembly as originally designed. This requirement helps assure fuel system integrity and provides for optimum use of the OEM fuel system attaching components. This will require the modifier to develop and install a new forward cross member for supporting the mid-ship tank when the frame is lengthened.

Fuel Tanks

It is not recommended to modify the existing vehicle fuel tank. If a replacement or additional fuel tank is fitted, the following guidelines should be observed:

- The fuel tank should be designed with as few openings and connections as possible. Openings and connections generally should be located on the upper surface of the fuel tank.
- Fuel tanks should be fitted with an evaporation control valve having the means to close if the vehicle is rotated about a longitudinal axis.
- The tank should be of simple configuration minimizing sharp surface transitions and protrusions which may be required for attachment or function.
- The tank should be strong enough to withstand instantaneous internal pressure imposed during a crash event.
- Hoses connected to the tank should be sufficiently flexible to permit small movements of the tank

relative to fixed mounting surfaces without rupture or disconnection of such hoses during a crash event.

- Emission regulations may require an OBDII fuel tank pressure sensor for the evaporative system. Any new fuel tank must be tested and comply with all emission regulations, including evaporative emissions.
- Package new tank away from heat sources such as exhaust.

Fuel Tank Retention Systems

It is not recommended to modify the existing vehicle fuel tank retention systems. If a replacement or additional fuel tank is fitted, the following guidelines should be observed regarding fuel tank retention:

- The retention system should attach the fuel tank to the frame between the frame rails and below the body of the vehicle with sufficient clearance for normal body to frame movement under loaded conditions.
- A retention system should restrict fuel tank movement in all possible directions to prevent contact or rupture with rigid or sharp objects, and the disconnection of fuel system tubes and hoses under crash conditions. Retention straps should avoid sharp edges and tank supports should be designed with fuel tank compatible surfaces and edges.
- System fasteners and attachments should be designed to retain the tank during deflections incurred during a crash event.

Fuel Fill System

The following recommendations should be followed regarding the fuel fill system:

- The fill system should be sufficiently flexible to prevent possible rupture or disconnection resulting from movement of the fuel tank relative to frame during crash situations.
- Any equipment or hardware attachments to the body in the area of a fuel system component should be designed, positioned, and secured so as not to impact any fuel system component during crash situations.

- The fuel filler opening area of the body should provide adequate sealing from the vehicle interior because holes or cracks in this area may allow fuel vapors to enter the vehicle interior. Openings should be sealed with a product which is fuel resistant. See Figure 3.

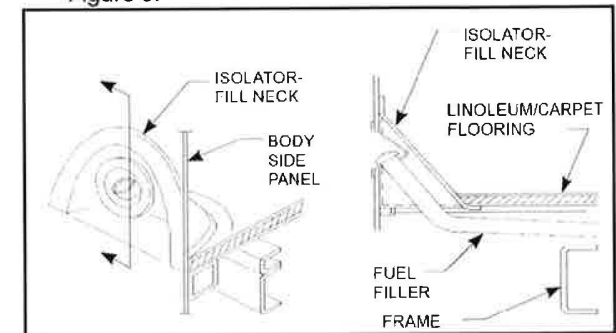


Figure 3 – Body Mounted Fuel Filler Openings

- The metal outer end of the fuel fill neck tube provided by Ford must be properly grounded to the chassis to dissipate any electrostatic charge that may be produced and reduce the possibility of a spark during fueling. A fill neck support made of metal would provide a ground path if directly mounted on the chassis. If the filler neck support is made of plastic or other non-metallic material, a ground strap or wire must connect the metal end of the fuel filler neck and a metal chassis component.
- Fill openings should be recessed, and caps, when installed, should be inside the normal body plane.
- Whenever possible, the fill system should pass under the body rather than through it. Where passing through floors and sides, the fill system should be shielded and have adequate clearance to surrounding structure. Fuel Filler and Vent Hoses should maintain clearance to body and surrounding chassis components. See applicable vehicle IVM for further details.
- Be sure that the fuel tank filler cap is the correct Ford designated part. Provide adequate hand clearance for cap installation and correct sealing of the cap to filler pipe.
- The acceptable horizontal and vertical locations for the fuel tank filler pipe are shown in the appropriate

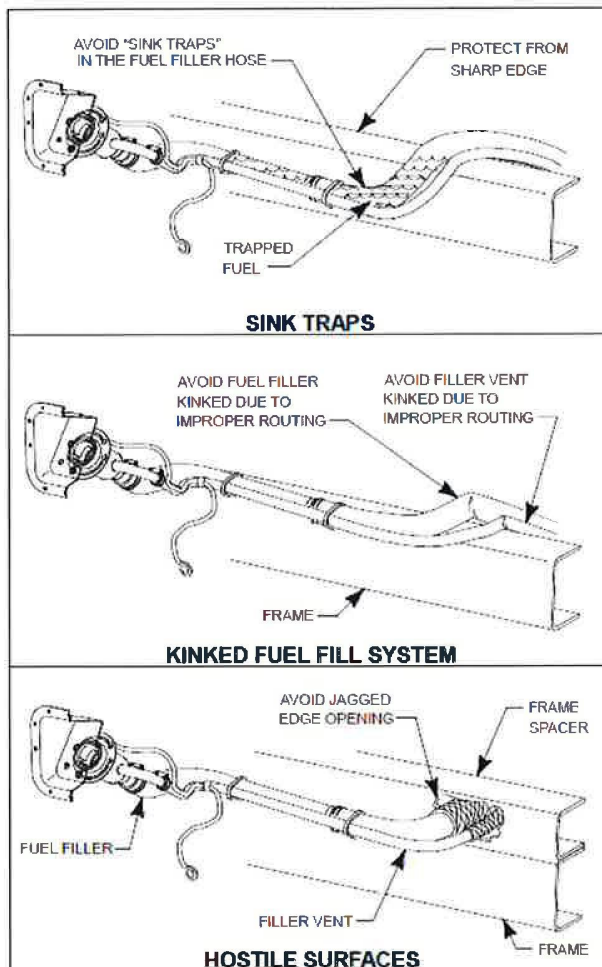


Figure 4 – Fuel Fill System Installation

vehicle specific IVM for Incomplete Vehicles and in the program specific BBLB for Box Removal vehicles.

- When installing accessories or equipment, avoid exposure of fuel and vapor hoses to surfaces with sharp edges (see "Hostile Surfaces", Figure 4) or high temperature surfaces (near hot exhaust or coolant). Also avoid installations which result in the exposure of these lines to road debris or undercoating.

- Install or route fuel tank filler hoses and filler vent hoses as follows:
 - Keep the flow of fuel continuously downward from the inlet of the fuel filler pipe all the way to the tank. See "Sink Traps" in Figure 4. Fuel trapped in low spots can be expelled when the cap is removed, even if the tank is nearly empty.
 - Avoid pinches or kinks as they may restrict fuel filling and venting. Hose length may require adjusting depending on second unit body width. See "Kinked Fuel Fill System", Figure 4
- Do not place adjacent hardware such that it may cut or otherwise damage the filler neck or vent hoses and cause fuel or vapor leakage. See Hostile Surfaces, Figure 4.
- The fuel fill hose and vent hose must be clear of moving suspension components so as to prevent abrasion which can result in fuel leakage.
- Be certain that all clamps are secure and properly located.
- The fuel fill and vent hoses should not contain fittings or connections other than those incorporated in the original design, nor should they be interconnected with each other in any way.
- Only Ford approved parts should be used.

Fuel Lines, Hoses and Pumps

The following recommendations should be followed regarding fuel lines, hoses and pumps:

- Do not reroute or change the attachment of fuel lines or fuel vapor hoses. Doing so may adversely affect vehicle performance by increasing the amount of heat absorbed by the fuel system or by restricting its venting.
- Tubes and hoses should be routed away from and not attached to members that will move or deform during crash situations.
- Tubes and hoses must be sufficiently flexible to avoid rupture or disconnection resulting from movement of the engine relative to the frame during crash situations.
- Tubes and hoses should be routed away from hot regions and sharp objects and should be retained

adequately to prevent movement into such regions or against such objects.

- Do not add fuel or vapor line flow restrictors as they can cause engine fuel starvation or abnormally high fuel tank pressures.
- Do not install auxiliary fuel pumps. This could cause the engine to run rich, producing additional exhaust heat.
- The special removal tool shown in Figure 5 must be used to open push connectors installed on flexible fuel lines, if the lines need to be disconnected. The appropriate tool is available from Ford Customer Service Division.
- The push connectors on flexible fuel lines, if disconnected, must be reconnected by snapping them back into position and installing the appropriate retainer as shown in Figure 5.
- Avoid pinching or kinking of any fuel vapor hose. (See Figure 6).
- Each of the fuel lines and fuel vapor hose retention clips provided by Ford must be used in original factory locations to prevent misplacement or movement of the lines.
- Be certain that the vent valves on top of the fuel tanks are seated and secure; do not dislodge or damage them when mounting the second unit body. If they are unseated, fuel leakage may occur. If damaged,

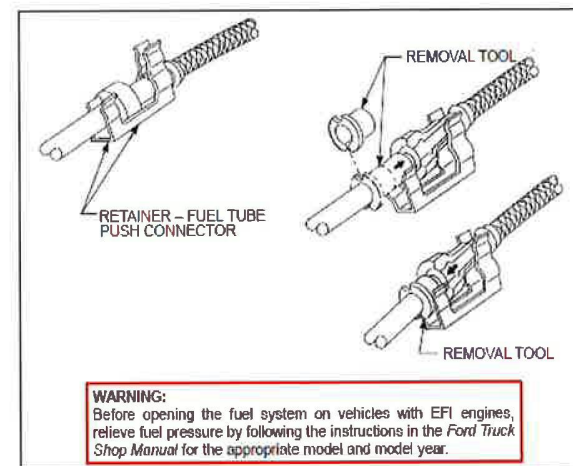


Figure 5 – Flexible Fuel Line Push-Connect

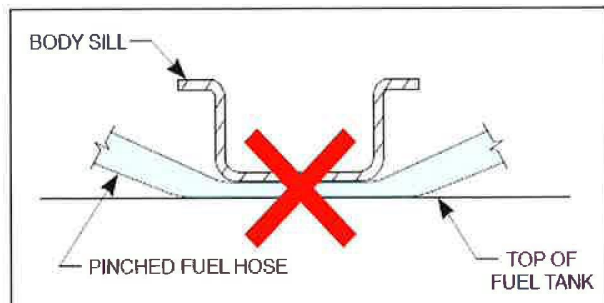


Figure 6 – Pinched Fuel Vapor Lines

the vapor vent system may not function, resulting in increased fuel tank pressure.

- If a fuel sender is removed for any reason, use a new gasket when it is reinstalled to prevent fuel leaks. Be certain the fuel sender is seated and secure on the top of the fuel tank. Do not step on or place weight on the sender during vehicle manufacture.
- Fuel filters installed in the fuel supply line must be of sufficient size to be nonrestrictive to fuel flow and placed so as to be protected from exposure to exhaust heat and physical damage. Ford replacement fuel filters are recommended. Filters are not to be installed in the fuel return line.
- Temporary shipping fuel lines are not to be reused. They should be recycled where possible or disposed of in an appropriate manner.
- Fuel system components which are disconnected during manufacturing should be capped or plugged promptly to prevent possible contamination.
- If fuel vapor lines need to be modified, they should be removed from the vehicle prior to being altered. If cutting the lines, debris from cutting should be minimized and immediately removed from the hose. All open ends should be promptly capped until the hose is reassembled to reduce potential for contamination.
- When welding near fuel system components, all metallic components must be adequately shielded and protected from heat or weld splatter. All nonmetallic components must be removed.
- Changing the length of a fuel line can consist of either replacing the intermediate OEM fuel line assemblies with new OEM equivalent assemblies, or the use of

OEM equivalent extensions. Cutting and splicing of stainless steel fuel tubes or braided flex lines is unacceptable. All lines must make use of OEM type fuel line connectors and be of OEM equivalent material quality and design.

- It is recommended that any flexible line extensions allow approximately one inch of additional length, in excess of the nominal length, to provide for routing and installation ease. This additional length will avoid a stretch-to-fit situation when reconnecting the fuel lines.
- Any fuel lines which have been kinked must be replaced.
- Do not allow any flexible fuel lines to coil or otherwise be routed outside of the frame side rail section. Fuel routings should remain inside the frame side rails, similar to the OEM routings, and be secured to the frame for maximum protection and safety.
- Secure all added fuel lines to the frame with clips and clip spacing consistent with the original fuel line routing.
- Evaporative system lines must not be kinked or routed in a manner which could cause them to collapse. Retention of evaporative lines must be consistent with the original line clip types and spacing. Extensions must be made of material similar to the original equipment.
- Inspect the installation for possible chafe and rattle condition with the frame, fasteners, and other lines.
- Do not coil or bend the braided flex line tighter than a five inch diameter. Excessive bending or mishandling can result in fuel hose kinks and permanent damage.

Fuel System Access for Auxiliary Fuel Powered Equipment

Precautions similar to those described in this Fuel System section should be taken in the design and positioning of a fuel system for auxiliary fuel-powered equipment. The auxiliary fuel-powered equipment should be securely mounted so as to withstand forces during crash situations.

Final stage manufacturers or alterers utilizing the auxiliary fuel port must install an electrically actuated, normally closed solenoid valve into the fuel line leading to the

auxiliary fuel powered equipment. The valve should remain open during the start and run cycle of the auxiliary equipment and must close immediately when the auxiliary equipment is turned off or is out of fuel.

All auxiliary fuel ports have a safety cap which must remain in place until a fuel consuming accessory is installed.

See appropriate program specific BBLB for more information regarding the location and use of auxiliary fuel ports where provided.